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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

DEC 53 AAAEO-640 6

Enmities Overcome

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A SCIENCE SERVICE PUBLICATION

BIOCHEMISTRY

Secret Hormone Source

Production of female hormone, after ovaries and adrenal glands are removed puzzles scientists. Finding made in cancer cases treated by removal of both adrenals and ovaries.

➤ EXISTENCE OF a "secret source" of the female hormone, estrogen, somewhere in the female body has been discovered by Dr. Charles B. Huggins of the University of Chicago Medical School, the American Cancer Society has reported.

And cortisone, famous anti-arthritis remedy from the adrenal glands, apparently can make dark hair grow in on heads that had turned white.

These are among several findings resulting from 80 operations in which Dr. Huggins has removed both adrenal glands to aid cancer patients.

About one-half of the patients who had far-advanced breast or prostate gland cancers have been helped by the operation.

The adrenal glands are vital organs situated one above each kidney. They produce cortisone, famous anti-arthritis remedy, and according to some authorities also produce some 20 other hormones.

In the past, patients whose adrenal glands were removed could not live. Dr. Huggins' patients, however, have been kept alive and able to return to useful occupations by treatment with cortisone. This is thought to show that of all the hormones presumably produced by the adrenal glands, only cortisone is essential.

An "odd finding," the Cancer Society reports, is that emotional flare-ups are rare in the patients whose adrenal glands were removed. Many of Dr. Huggins' patients have reported that the things they used to fear, they no longer fear. Some who had frequent fits of anger now live relatively complacent and serene lives. Anxiety was banished with removal of the adrenal glands. This is considered "odd" because the adrenal glands are regarded as the "organs of stress."

The hormones they produce enable animals and humans to cope with unexpected strains and the routine stresses of everyday life. When animals' adrenals are removed they die in a matter of a few days, and any sudden stress—such as fright, hunger, cold, injury or exertion kills them outright.

The anti-gray hair action of cortisone appeared in some of the male prostatic cancer patients whose hair was white before the operation. They now have iron gray hair under cortisone treatment. Hair grew in dark at the roots.

To deprive cancers of the sex hormones which appear to make hormone-dependent cancers grow, breast and prostatic cancer patients sacrifice not only their adrenals but their sex glands, testes or ovaries, as well.

By delicate chemical methods, the Huggins group has been studying hormones and hormone-products excreted in urine. They hope that by these methods they can learn before operation which patients will respond well to adrenalectomy and which will not. So far, this research seems to indicate that breast cancer cases which may be benefited excrete large amounts of female hormone.

One of the puzzling results of these studies is the finding that some breast cancer patients continue to produce and excrete female hormone (estrogen) after their adrenals and ovaries have been removed. These patients derive no benefit from their operations. The big question is: Where do these hormones come from? If their source can be found, it is possible that it might be eliminated and the patient helped.

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RADIO

Saturday, Jan. 24, 1953, 3:15-3:30 p.m., EST

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Robert E. Marshak, chairman of the department of physics, University of Rochester, Rochester, N. Y., discusses "High Energy Particles Within the Atom."

VETERINARY MEDICINE

Medicine Saves New-Born Calves

➤ FARMERS CAN now get a new streptomycin-containing medicine for treating an often-killing disease of new-born calves. The disease is an intestinal infection called scours.

The remedy, also said to be good as a preventive, is a combination of dihydrostreptomycin, kaolin, pectin and hydrated alumina powder. It goes on the market this month under the tradename Kao-Strep and is manufactured by Wyeth Incorporated, Philadelphia.

Scours is marked by fever, diarrhea and pneumonia, and is probably due to a virus.

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MEDICINE

Should Acidify Drops

➤ DOCTORS WHO fail to prescribe ephedrine or similar nose drops or sprays to relieve stuffy noses during colds are guilty of "complete therapeutic neglect," Dr. Noah D. Fabricant of Chicago charges in a report in the *Journal of the American Medical Association* (Jan. 3).

These medicines are known to doctors as vasoconstrictors because they constrict small blood vessels in lining membranes of nose and sinuses. This reduces the congestion, or stuffiness. Such relief, although temporary and no cure, is "welcome to distraught patients," Dr. Fabricant points out.

Criticizing those who lean too heavily to psychiatric causes of nasal congestion, Dr. Fabricant says:

"There is little to indicate that the current passion for psychosomatic phraseology will alleviate millions of inflamed and allergic American noses."

The nose drops, sprays or jellies used, however, should be slightly on the acid side, or at least should restore the normal, slightly acid state of the nasal secretions, Dr. Fabricant insists.

The acid state is unfavorable to the growth of disease germs, he points out. Lysozyme, antibacterial substance in various body tissues which is a kind of ancestor of penicillin, operates best in an acid environment. So getting the nose back to the acid side during colds should help the lysozyme in nasal secretions fight the germs.

Stuffy noses lead to overventilation and blowing off of carbon dioxide, Dr. Fabricant finds. This changes body chemistry so that nasal secretions become alkaline. Relieving the stuffiness thus helps bring the nose back to normal.

Dr. Fabricant's findings were made on human and rabbit noses which got drops of congestion-relieving medicines of varying degrees of acidity and alkalinity.

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VETERINARY MEDICINE

Foresee Conquest of African Cattle Plague

➤ AUREOMYCIN, ONE of the so-called mold remedies, may become the means of conquering one of Africa's cattle plagues.

The disease is called by several names, among them Rhodesian fever, East African fever and Rhodesian red-water fever. High fever, swelling of the lymph glands, and death after about three weeks make up usual course of this cattle plague. It is caused by a parasite similar to the one that causes malaria, but is spread by a tick instead of a mosquito.

Aureomycin, injected into the veins in repeated large doses after the parasites have gotten into the animal, make the schizont stage of the parasites disappear. The animal then gets well and is immune to further attacks.

These results are reported by Dr. O. W. Neitz of the Department of Agriculture Division of Veterinary Services at Onderstepoort, South Africa, in *Nature* (Jan. 3).

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PUBLIC HEALTH

'Flu Epidemic Expected

Troops going to both Korea and Europe now receiving a one-shot vaccine to protect them from influenza outbreaks. 'Flu is no longer on list of reportable diseases.

➤ AN INFLUENZA epidemic is attacking the Army all over the world. It is expected to hit the civilian population in the United States shortly, possibly about the time of Inauguration Day.

Outbreaks have been reported to the Surgeon General of the Army in Washington from the Far East, Europe and Army stations in Missouri, California, Virginia and Maryland.

A one-shot vaccine effective against influenza viruses A, A prime and B will be given to all men at ports of embarkation, and probably to all troops in Europe as well as to all in Korea, the Acting Surgeon General, Maj. Gen. Silas B. Hays, announced in Washington. Troops in camps in the United States will not be vaccinated except in special circumstances because the vaccine takes two weeks to become effective and by that time most will have had 'flu or been exposed to it.

Starting with an outbreak at Fort Leonard Wood, Mo., the end of November, influenza in the Army in the United States climbed rapidly. Cases for December, 1952, occurred at twice the rate of December, 1951. In Korea it has also spurted up much faster than in 1951 and in Europe it has taken a spurt among U. S. troops within the past two weeks.

Where laboratory tests have confirmed the diagnosis, the 'flu in the Army is due to A prime virus. Cases have been mild and there have been no deaths to date and very few complications. Most patients are in the hospital only a week or 10 days and then are able to return to full duty.

Here and in Europe there has so far been very little influenza among civilians, according to U. S. Public Health Service and World Health Organization reports. According to Japanese statistics, however, half the population of Tokyo has had or now has influenza.

Although the current epidemic in the Army is almost global, it is not considered like that of 1917 and 1918 because of the mild form of the disease, the vaccine, and the fact that pneumonia and other complications that killed then can be checked now by penicillin and other antibiotics.

'Flu Outbreaks Not Reported

Influenza is no longer on the list of reportable diseases. Instead, state health officers report outbreaks of acute respiratory infections and the Public Health Service asks for laboratory confirmation of the diagnosis and school and employment absenteeism. Such information is considered more reliable as a gage of whether there is 'flu around and how much.

So far this winter there have been two outbreaks confirmed by laboratory diagnosis, one in Colorado and one in Missouri. The third, in a county in North Carolina, was reported as an outbreak of an influenza-like disease affecting half the families in the county. Tests to confirm the diagnosis, however, have not yet been completed.

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TECHNOLOGY

Sugar Plantations To See Cane Flow on TV

➤ TWO OF Hawaii's sugar plantations are preparing to install their own "closed circuit" television systems so technicians in the mill may have a continuous view of the cane as it moves from the cleaning plant to the grinding machinery.

On each plantation, the television camera will be mounted at a strategic point above the conveyor, its lens shielded from dirt and spray. A coaxial cable will carry the picture to a receiver at the control center.

The plans are announced by the Waialua Agricultural Co. and the Ewa Plantation Co., both on Oahu Island.

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BIOLOGY

Seven Giraffe Births In Captivity Is Record

➤ WITH THE birth of 150-pound, five-foot—mostly neck—Harriet, her seventh child, Kitty, a Nubian giraffe, and her mate Bob have established a record for the number of giraffes born in captivity, authorities at the National Zoological Park in Washington believe.

Kitty arrived in this country in 1937 as the result of an expedition to Africa. Her experience as a mother convinces zoo experts that the period of gestation of the giraffe, listed in books as 13 months, is actually closer to 15 months.

Baby Harriet was extremely active and inquisitive when only a few hours old.

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SEVENTH BABY GIRAFFE—Kitty stretches her neck to caress her seventh baby, Harriet, a new year-end addition to the giraffe section at the National Zoological Park in Washington.

ASTRONOMY

Universe Creation Theory

➤ THERE IS a new theory of supersonic creation of the universe.

The galaxies of stars in the universe began with turbulent gases moving at supersonic speeds, Dr. George Gamow of George Washington University told members of the American Astronomical Society meeting in Amherst, Mass.

The elemental gas was in such a state of turbulent motion that it was buffeted about with a supersonic Mach number four, which is about 3,000 miles per hour or four times the speed of sound, Dr. Gamow estimates. Such supersonic turbulence must be assumed, he said, to explain how the galaxies of stars were formed in the relatively short time of only 70,000,000 years, as Dr. Gamow calculates.

Up until the time when the heat of the universe dropped from billions of degrees to about room temperature, what little gas there was had been pushed around more by radiation than anything else. At this period there was very little matter, only about one atom of gas per cubic inch and one particle of dust per several thousand cubic miles.

In time, however, matter became more important than radiation and played a larger part in the formation of the universe. Up to this point the gas had been pretty evenly mixed, but now it began to break up into individual gas clouds, or protogalaxies.

A mass of gas only 50,000,000 times as bulky as the sun was enough to form a galaxy of millions of stars and nebulae, Dr. Gamow estimates. This figure is lower than the observed mean mass of galaxies today, he admits, but the turbulent motion of the gas made creation possible for the galaxies and the individual stars of which they are composed.

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AERONAUTICS

New "Stopway" Strips

➤ ECONOMY IN construction, without sacrificing safety, is promised with a new type of take-off strip at international airports. Runways would be shorter than present standard lengths, but each would have an extension called a "stopway" for use in emergencies.

Beyond the end of the stopway would be what is called a "clearway," an area without obstructions which is already regarded as an essential for safety in case a plane fails to achieve a proper altitude. Runway, stopway and clearway, as extensions to each other, would constitute the proposed take-off strip.

This type of take-off strip was proposed by a committee of the International Civil Aviation Organization in Montreal. Findings of the ICAO must be adopted by the individual nations before they go into operation.

Existing ICAO standards call for runways longer than needed for a normal take-off. They call for runways long enough for a pilot to bring his aircraft to a halt in the event of an engine failure before full flying speed is reached. The new specifications permit the use of a shorter runway of heavy pavement, but involve no decrease in safety because the stopway is added as a continuation of the runway. The stopway is of less expensive construction, but with sufficient strength for emergency uses.

The term "clearway" for the extension beyond the stopway may be new, but the idea is not. American aviation authorities have long insisted that all modern airports have a region clear of tall buildings and other obstructions at the ends of their runways. Without such clearways, planes landing and taking off are in danger.

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MEDICINE

Stop Profuse Bleeding

➤ SUCCESSFUL USE of a by-product of whole blood for quick stopping of dangerous bleeding in expectant mothers is announced by Dr. F. W. Tamblyn of Lansing, Mich., in a report to the Michigan State Medical Society.

The blood by-product he used is anti-hemophilic globulin. The patients, however, were not suffering from the bleeding disease, hemophilia. In one case a single injection of this blood by-product stopped bleeding in five minutes although other measures, including transfusion of seven pints of whole blood, had not.

One patient, a nurse, had two bouts of bleeding during the nine months she was pregnant. The first time she was put to bed and given blood transfusions. The bleeding gradually subsided over a period of five days. The second time, she was given the anti-hemophilic globulin and the bleeding stopped in less than two hours.

"Why didn't you give me this the first time?" she asked.

She later had a normal baby.

Not all the patients were expecting babies. Some had cancer and one had a small fibroid tumor of the uterus. One patient continued to hemorrhage even after getting a quart of blood by transfusion and having a pack of the coagulating gel-foam inserted. Two doses of the anti-hemophilic globulin within eight hours stopped the bleeding.

Dr. Tamblyn points out that in giving anti-hemophilic globulin three factors are being added to the patient's blood: fibrinogen, accelerator globulin and anti-hemophilic factor. Which of these is effective or whether it is the combination is not definitely known. But Dr. Tamblyn thinks the results in his cases are so good that further studies should be made of this blood by-product for stopping some kinds of bleeding.

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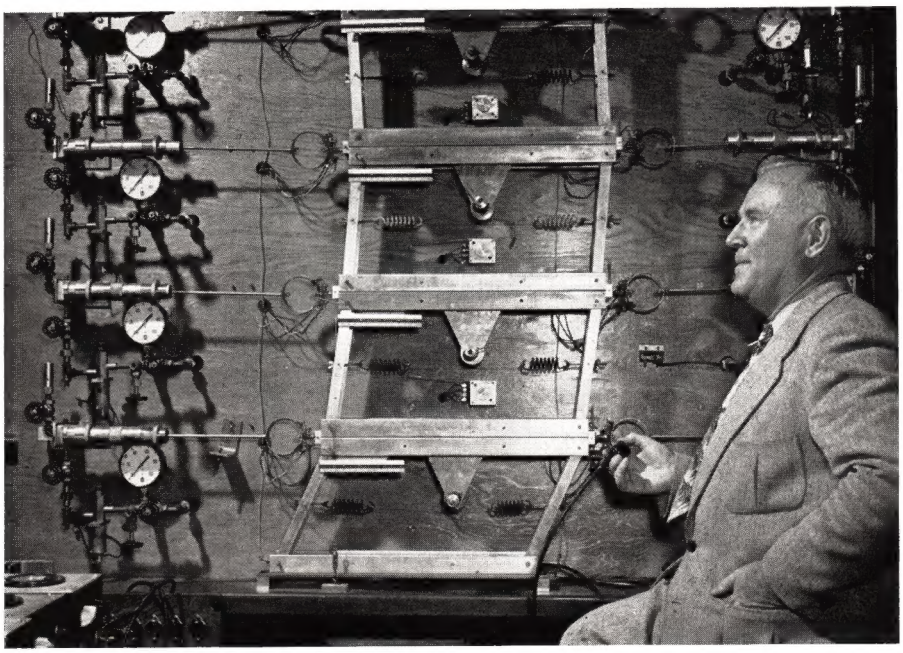

H-BOMB BLAST EFFECT—This model of a four-story building, represented by the four metal frames, is used at Stanford University to test the effects of bomb blasts on construction. The bent steel frames would, in reality, be twisted wreckage. Air-driven pistons can be adjusted by Prof. Lydik S. Jacobsen to represent the blast pressure of different bombs at varying distances from the building.

GENERAL SCIENCE

Predict More Destruction

➤ THE "YET" unforeseeable peaks of destructive power" predicted for atomic bombs of the future by President Truman in his State of the Union message leave even the physicists gasping.

Physicists to whom SCIENCE SERVICE has talked, even those who have been close to the A-bomb and H-bomb programs, declare they cannot imagine anything more horrible or with more destructive power than the H-bombs made practicable by the recent Eniwetok experiments.

Yet, one admitted, there is a possibility. "It's fantastic," he said, "but this is what the President might have been talking about—a controllable chain reaction in the atmosphere."

When the H-bomb was first publicized three years ago, some physicists expressed the fear that the fusion process set going in the explosion might spread to the atmosphere around the bomb and keep spreading uncontrollably until all the earth's atmosphere would be destroyed.

If the Atomic Energy Commission physicists have thought of a way to start a chain reaction in the atmosphere with an H-bomb and then stop it again before it spreads too far, this might be one of the future "peaks of destructive power" of which the President wrote.

Some columnists to the contrary, most physicists pooh-pooh fears of spreading radioactive poisoning with H-bomb explosions. Meteorologists, who know the problems of diffusing materials or particles through the atmosphere, back them up.

There remains the question of whether Stalin actually will be scared by the President's warning of worse things to come than the H-bomb. Some people believe that the H-bomb is probably too big for most targets in the Soviet Union—the targets usually can be destroyed by the smaller A-bombs. Also, Stalin might well be in a position to say to President Truman: "We can give you tit for tat."

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GENERAL SCIENCE

Warren Weaver Is President-Elect of AAAS

➤ DR. WARREN WEAVER, director for the division of natural sciences and agriculture of the Rockefeller Foundation, New York, was named the president-elect of the American Association for the Advancement of Science by the members at their annual meeting held in St. Louis.

A mathematician, Dr. Weaver has been director of this division since 1932, when he resigned as chairman of the University of Wisconsin's mathematics department.

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ANTHROPOLOGY

Bones of Oldest True Man Discovered

➤ A FRAGMENT of the bones of the most ancient true man so far known has now been cleaned and subjected to scientific study.

This first man, who lived many millions of years ago in Africa, is described in *Nature* (Jan. 3) by Dr. J. T. Robinson, anthropologist of the Transvaal Museum, Pretoria, Africa.

The new bone specimen, classified by Dr. Robinson as *Telanthropus capensis,* consists of a well-preserved portion of the nose with part of the palate intact. The region of bone below the nose has an angle of slope like that of true man and unlike that of any pre-man, and the nose itself is set on the face in human fashion.

The socket for the left canine tooth is intact and is too small for even the smallest of ape-men tooth roots. The palate is deep as it is in humans.

"There seems small doubt," Dr. Robinson concludes, "that *Telanthropus* is a very primitive euhominid (true man)."

"It demonstrates the very close relationship between *australopithecines* (African pre-men) and man, and is almost certainly the oldest euhominid so far known."

These bones of early man were discovered in the Swartkrans site, three-quarters of a mile west of Sterkfontein and about 25 miles northwest of Johannesburg, Africa. The site is Upper Pliocene in age.

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EDUCATION

Girls Ready for School Earlier Than Boys Are

➤ LITTLE BOYS should be six months older when they start to school than little girls.

Tests of school children indicate that girls mature that much sooner than boys, Dr. Frank R. Pauly, director of research of the Tulsa, Okla., public schools, told the meeting of the American Association for the Advancement of Science in St. Louis.

In the sixth grade the girls are still ahead. Although two months younger than the boys in the class, they scored six months ahead of the boys on arithmetic and as much as a year and a half ahead on language. It is not until the first year of college that the boys mature enough to catch up with the girls.

If the boys were admitted to school six months later, Dr. Pauly told the meeting, it would not only be better for the boys' schooling, but it would save about 2% on the cost of education over the nation.

There would also be less heartache to boys and their parents due to poor report cards, and fewer boys would drop out of high school because of unsatisfactory work, Dr. Pauly said.

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PHYSICS

Took 63 Scientists To Prove Einstein Right

➤ THE FIRST direct experimental proof of an equation Einstein published in 1905 has been obtained by a group of 63 scientists working at the Transistor Teachers Summer School of Bell Telephone Laboratories, Murray Hill, N. J.

The equation shows that electrical conductivity takes place as a diffusion process. The scientists verified Einstein's relationship for electrons and holes. Electrons are small, negatively charged particles; holes are places where electrons should be but are missing, thus they act like positive charges.

To show the relationship, the scientists injected electrical pulses into single crystal rods of very pure germanium, then measured changes in the current. The way in which the current varied was observed with an oscilloscope, a television-like instrument.

According to Einstein's theory, the relationship between the diffusion constant and mobility of charged particles depends upon the temperature, a physical constant known as the Boltzmann constant, and the magnitude of the particle's charge. The Einstein relationship has been verified previously using colloidal particles and ions, the scientists state in the *Physical Review* (Dec. 15, 1952).

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ASTRONOMY

Most Bright Comets Are Two to Three Miles Across

➤ BRIGHT COMETS that take hundreds and even thousands of years to complete their trips into the outer reaches of the solar system and return to the vicinity of the sun usually are two to three miles across, estimate Drs. Salah El-Din Hamid of Helwan Observatory, Egypt, and Fred L. Whipple of Harvard College Observatory.

These comets, with hearts of ice and frozen gases such as ammonia and methane, lose about one-half percent of their mass each time they swing near the fiery sun, Drs. Hamid and Whipple told members of the American Astronomical Society meeting in Amherst, Mass.

It was Dr. Whipple who, several years ago, suggested that the solid nucleus or heart of a comet is turned by the sun's heat into the huge cloud of gas which makes up the head of a comet. The fan-like tail, by which a comet is most easily spotted, is caused by the sun's radiation that forces the gases and dust back from the comet's head.

It is the jet action of the vaporized ices on the comets that accounts for the observed deviations of the comets from the motions expected of inactive comet nuclei, the astronomers stated. From the way in which a comet actually wanders from its proper path, Drs. Hamid and Whipple can calculate how much the comet reduces its waistline each time it visits the solar system.

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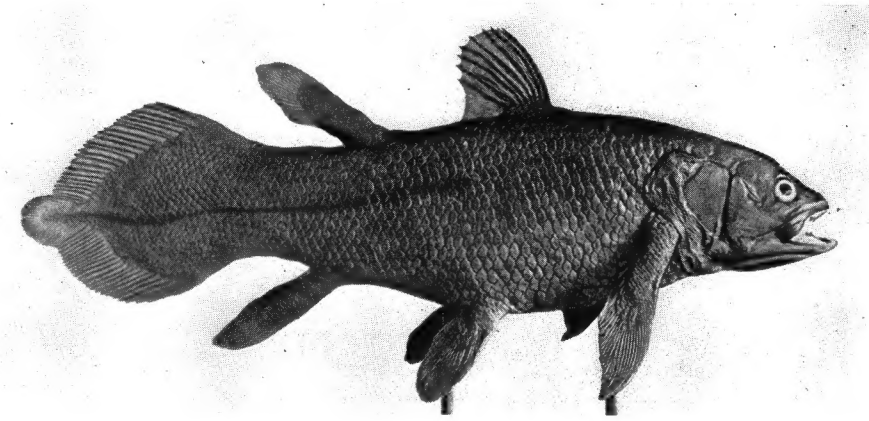

ANCIENT FISH—Shown here is a photograph, taken from a cast at the South African Museum, of a five-foot coelacanth, a "living fossil" fish believed extinct until its capture in 1938 and again recently.

MARINE BIOLOGY

Capture "Living Fossil" Fish

South African finds a coelacanth, "missing link" specimen that allows glimpse of life in the past. Strange fish scale at Smithsonian shows Gulf of Mexico may hide unknown fishes.

➤ THE RECENT capture in African waters of a coelacanth, a primitive lobe-finned fish of a family thought extinct for at least 50,000,000 years, has reopened a mystery buried in files at the U. S. National Museum in Washington since 1949.

Are there coelacanths or other "extinct" fishes hidden in the depths of American seas? On the evidence of a single fish scale sent to the museum from Tampa, Fla., in 1949, fish specialist Dr. Isaac Ginsburg believes that a large, primitive-type fish, unknown to science in the region, dwells in the Gulf of Mexico.

"This scale is like no other fish scale I have ever seen," Dr. Ginsburg said. It is not the scale of any of the several hundred known fish species of the Gulf of Mexico, he stated, and it is apparently of primitive structure.

It is not impossible that this is the scale of a coelacanth, Dr. Ginsburg said, but added that the real significance of the unique fish scale is that—coelacanth or not—it shows the existence of creatures beneath American waters unseen and unknown to science.

How Dr. Ginsburg obtained the mystery scale is an absorbing account in itself. A woman from Tampa, Fla., buys fish scales from fishermen to use for making ornaments. One day in 1949, she bought a gallon of scales like none she had ever seen before, about one and a half inches in diameter, the size of tarpon scales but of a different structure entirely.

She was so intrigued by her purchase that she sent one of the scales to the National Museum for identification, where it came into Dr. Ginsburg's hands.

Dr. Ginsburg and other fish specialists at the museum were mystified by the enigmatic scale. What is was from, no one knew. He wrote the woman, asking for more scales and information about the man that brought them in, what the fish looked like and where it was caught.

This letter was never answered. The woman did not realize the possible value of her "ornamental scales" to science. And so, if any of that precious gallon of scales exist today, they probably lie forgotten along with other "souvenirs of Florida" sold to tourists the country over.

Though America may or may not be the home of coelacanths, the recent capture of a five-foot, 120-pound specimen in the Indian Ocean near Madagascar does mark the second actual specimen recovered by scientists.

The first coelacanth ever brought to the attention of science was caught in 1938 near East London, South Africa, in a commercial fisheries trawl. (See SNL, April 1, 1939, p. 195.) This discovery excited the attention of scientists the world over, because the whole family of lobe-finned (crossopterygian) fish to which it belongs had supposedly been extinct for more than 50,000,000 years. The family of lobe-finned fishes are thought to have given rise to amphibians, the first true four-legged, partly terrestrial animals, of which frogs and newts are examples.

It was known from fossil remains that lobe-finned fishes had central bones in their fins, which could have given rise to true terrestrial limbs. They had functional lungs, their teeth were almost identical with those of primitive amphibians, and in other ways

they resembled the first animals that roamed on land.

These were just some of the things scientists eagerly expected to examine when news of a real flesh and blood coelacanth turned up after a blank 50,000,000 years. But before it could be studied, the world's most important fish had putrified, its priceless internal parts had been thrown away by a taxidermist, and only the skeleton and mounted skin remained.

Prof. J. L. B. Smith, of Rhodes University, South Africa, took it upon himself to find another coelacanth. He distributed illustrated leaflets up and down the east coast of Africa, printed in English, French and Portuguese. He cajoled trawler skippers to watch for the precious fish. He offered a handsome reward for its capture.

Then in December his 14 years of searching paid off. A native of the Comoro islands, near Madagascar, was about to sell a large, queer fish in the local market, when another native excitedly told him it was worth "plenty money." The second native had recognized it from one of Prof. Smith's leaflets as a coelacanth.

The fisherman received £100 ($280) for his catch. But to scientists, the intact, wholly preserved coelacanth lies beyond all price for the great light it promises to throw on the mysteries of evolution and the migration of life from water to land.

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PHYSICS

Touch of Hydrogen Helps Make Radiocarbon

➤ JUST A touch of hydrogen helps when scientists make carbon 14 out of beryllium nitride. Carbon 14 is the radioactive form of carbon being used so extensively in biological research. The Atomic Energy Commission lists over 220 different compounds of it available for scientific work.

Some of the problems of making radiocarbon in the Oak Ridge nuclear reactor were told to the American Association for the Advancement of Science meeting in St. Louis by Dr. Alexander Langsdorf, Jr., of the Argonne National Laboratory.

Not ordinary carbon, but nitrogen, is the raw material for carbon 14, as it is made in the Oak Ridge pile by atomic transmutation. To get the nitrogen, which occurs in air as an inert gas, into a form more easily handled, scientists of the A.E.C. decided in 1946 to combine it with a suitable metal, and found beryllium best.

Experience since that time in large scale production of beryllium nitride has led to discovery, recently patented by Dr. Langsdorf and assigned to the A.E.C., that too much purity of ingredients hampers the process. Hydrogen making three percent of the gas helps combine the nitrogen with the beryllium. After irradiation, the newly formed carbon is found in a number of different combinations, Dr. Langsdorf reported at the meeting.

Science News Letter, January 17, 1953

GENERAL SCIENCE

Russian Science Corrupted

Predicts destruction of science in U. S. S. R. soon to spread to other fields so far untouched. Physics, mathematics and engineering there now appear to be adequate.

➤ THE DESTRUCTION of science in the Soviet Union caused by slavish following of the communist party line is about to spread to many fields that have not yet been corrupted, Dr. Conway Zirkle of the University of Pennsylvania predicted to the American Association for the Advancement of Science meeting in St. Louis.

Hints have appeared in the Soviet press that discussions of various fields of science are planned, which will be followed by recantations of those on the losing side and the triumph of charlatans, if previous course of events is followed.

Despite the fact that a large part of science, including genetics, statistics, psychology and psychiatry, biology and agriculture, physiology, pathology, medicine and astronomy, has been ruined, Russian physics is definitely good, mathematics is excellent and engineering is probably adequate for all military and civilian purposes, in Dr. Zirkle's analysis.

The reason that physics, mathematics and engineering appear to be adequate is either that their results can be tested by performance, such as by exploding an A-bomb, or that the commissars cannot understand enough to interfere.

The communist domination of science is out of even communist control, Dr. Zirkle pointed out. The final authority in science is in the hands of non-scientists and the treatment of scientists has been such that they dare to tell their masters only what they believe their masters want to hear. The political authorities in Russia have thus cut themselves off from any access to the truth in many scientific fields.

All Russian scientists, whether stupid, intimidated or disgusted, have been reduced to playing the roles of charlatans when they deal with politicians. The rulers of Russia are consequently not justified in believing anything that their scientists tell them. They cannot correct conditions, even if they are positive that quackery is rampant.

In some fields of Russian science there are no honest and capable scientists left, Dr. Zirkle has found, and these sciences can recover in Russia only by the importation of scientists from abroad to train and educate a new generation of Russians. From the evidence provided by studies by many experts, Dr. Zirkle finds:

Genetics has been replaced by an archaic quackery which repudiates evolution applied to man and upholds the inheritance of acquired characters.

Statistics has lost its basic honesty and is now used to falsify data for propaganda purposes.

Psychology and psychiatry are practically dead, with little chance of recovery.

Biology and agriculture are permeated by quackery and nothing of importance can be expected of them.

Physiology, pathology and medicine are so forced into a rigid and stupid orthodoxy that their future development is inhibited, but some sound practices survive.

Geology is subjected to political attacks, and pure research in this field is discouraged.

Astronomy includes the amusing quackery of astro-botany or the study of plant life on the planets. Certain theories as to the origin of the solar system are forbidden, but much excellent work is being done by Russian astronomers.

Much good chemical research is being done, although certain theories, such as resonance, are forbidden.

The basic philosophical background of modern physics is called idealistic and condemned and many of the words are separated from their meanings. Basic research in physics is probably not hurt.

Science News Letter, January 17, 1953

PUBLIC HEALTH

Public Health Service Has Inspection Privileges

➤ WHEN CONGRESS considers the request of the Food and Drug Administration to restore to the Food, Drug and Cosmetic Act the factory inspection provision, it may take into account the fact that it has given the U. S. Public Health Service inspection privileges for control of manufacture of biologics such as vaccines, serums, antitoxins and the like.

The factory inspection in the Food and Drug Act was invalidated by a Supreme Court decision on Dec. 8, 1952, on the ground that the law was not clear on this point. Food and Drug officials state that they cannot be sure a product is manufactured under sanitary conditions unless they can inspect the premises where it is made and observe the methods of manufacture.

The law governing biologics control says officers, employees and agents of the Public Health Service "may during all reasonable hours" enter and inspect plants where biologic products are made. In actual practice, Public Health Service officers inspect such plants regularly once a year and oftener if it seems advisable. This inspection is one of the main jobs of several Public Health Service doctors.

Science News Letter, January 17, 1953

MEDICINE

Drugs for Other Ills Tried in Polio Fight

➤ ANTI-GOITER DRUGS, anti-vitamin chemicals such as are used in treatment of leukemia, and PAS, or para-aminosalicylic acid, used in treating tuberculosis, are going to be tested as possible drugs for fighting infantile paralysis.

The tests will be made in laboratory mice. The drugs named above are just a few of a large group of chemicals that will undergo testing in a screening operation that starts at Indiana University Medical Center, Indianapolis, with a $12,975 March of Dimes grant from the National Foundation for Infantile Paralysis. The tests will be made by Drs. Randall L. Thompson and Sherman A. Minton.

Discovery by scientists that certain drugs which protect laboratory mice against smallpox vaccine virus might also protect the mice against certain strains of Type II polio virus has led to this large scale project for finding an anti-polio drug.

Science News Letter, January 17, 1953

MEDICINE

PAS Aid in TB Due To Anti-Thyroid Action

➤ PAS, ALLY to streptomycin in the fight against tuberculosis, may owe some of its beneficial effect to its anti-thyroid action.

Specifically, the gain in weight, lowering of temperature and slowing of the pulse may be due to this action, reports Dr. Roderick R. Hamilton of Hawick, Scotland, to the *British Medical Journal* (Jan. 3).

PAS, short for para-aminosalicylic acid, causes enlargement of the thyroid gland but it is the kind of enlargement seen in people who have goiters because their thyroids are underactive, Dr. Hamilton found. In one of his patients, giving thyroid extract with PAS prevented the gland from enlarging.

PAS, it has been found, will take up and hold a large amount of iodine from a solution. It may be that it interferes with production of the thyroid gland hormone by taking its iodine.

Science News Letter, January 17, 1953

CYTOLOGY

Ultra-Fast Freezing Keeps Heart Cells Alive

➤ CELLS FROM the heart of a chick embryo have been kept alive for one month, frozen at about 350 degrees below zero Fahrenheit, without any decrease in vitality.

Dr. Basile J. Luyet of St. Louis University, describing his experiments on ultra-rapid freezing of living tissue, told the American Association for the Advancement of Science meeting in St. Louis that frozen cells can be kept intact and alive by cooling them very rapidly—several hundred degrees per second.

Ordinary freezing causes the liquid portion of living cells to crystallize, destroying the basic cell structure. Ultra-rapid freezing, however, occurs so fast that crystals do not have time to form, Dr. Luyet said.

Ultra-rapid freezing may give scientists a valuable tool for the study of the fine structure of cells, Dr. Luyet said. He is working on a method of removing the frozen, noncrystallized liquid from a rapid-frozen cell by vacuum. This will leave a dry cell framework, or "petrified cell," that can be studied with high-powered microscopes.

Science News Letter, January 17, 1953

ASTRONOMY

Supergiant Bright Stars Pepper Magellanic Cloud

➤ CONSTELLATIONS OF blue stars in the Large Cloud of Magellan, the nearest galaxy to our own Milky Way system of stars and nebulae, contain scores of supergiant stars 10,000 times as bright as the sun, Mrs. Virginia McK. Nail and Dr. Harlow Shapley of Harvard College Observatory stated at the meeting of the American Astronomical Society in Amherst, Mass.

These Magellanic constellations are each composed of a score of supergiant stars similar to those found in our well-known constellation of Orion, the giant hunter, Dr. Shapley said. Although most of these stars are blue, there are among them a few supergiant red stars. These red stars are colossal in volume, some of them exceeding our sun by a million times.

These blue super-radiant bodies are relatively young in terms of the sun's age, the Harvard astronomer pointed out. They may have existed as giant stars for only two to three million years. Such an estimate of youth is consistent with the growing belief that the whole of the Magellanic Cloud may have been created relatively recently.

Science News Letter, January 17, 1953

GENERAL SCIENCE

Research Animals Now Ride Airline

➤ BARRIERS PREVENTING air transportation of laboratory animals are beginning to break down, in response to pleas by worried scientists who need their animals in a hurry.

Following repeated requests by scientists and a sympathetic memorandum sent out by the Civil Aeronautics Administration, at least one airline, National Airlines, has agreed to accept small laboratory animals on all flights.

Ben Stern of the CAA's office of aviation information reports to the scientific world through *Science* (Dec. 26, 1952) that the airline made only four simple conditions for the shipment of research animals. The animals must be consigned exclusively to recognized research organizations, inoffensive to passengers and crew, packaged leakproof, and the packages must be easy to handle.

Science News Letter, January 17, 1953

IN SCIEN

TECHNOLOGY

Putty Plugs Radio Leaks In Microwave Antennas

➤ A PUTTY has been developed to plug radio leaks in horns of directional microwave antennas similar to those used in the Bell system to beam television programs across the country.

Based on Thiokol, a rubber-like substance, the putty seals cracks between strips of metal forming the antenna-horn. The tiny cracks act as antennas themselves, allowing some of the microwave energy to escape in the wrong direction. When that happens, the escaping microwave program may be picked up by antennas on the same tower receiving a different program. Crosstalk interference results.

The putty "plugs" the cracks against radio leakage by forming a conducting path across the joints so that no line of electric force bridging an air gap in the joint can send off radio waves. In addition, the putty waterproofs the joint, resists sunlight, resembles aluminum in color, is adherent and remains flexible even at such chilly temperatures as minus 40 degrees Fahrenheit.

Technical details of the putty are reported in *Bell Laboratories Record* (Dec., 1952).

Science News Letter, January 17, 1953

TECHNOLOGY

Barite in Concrete Cuts Hazards From Radiation

➤ USING BARITE as an aggregate in concrete, engineers can construct buildings to withstand the blast of bombs well and also to shield persons inside from death-dealing gamma rays of A-bombs.

Working at the Nova Scotia Technical College, Halifax, under sponsorship of the Defense Research Board of Canada, K. A. Shelstad, V. E. Vaughan, and E. L. Cameron found that a barite aggregate readily produces a high-density concrete of 200 pounds per cubic foot. Ordinary concrete has a density of 145 to 150.

A maximum barite particle size of three-fourths of an inch can be used when the compressive load on the concrete is not to exceed 3,000 to 3,500 pounds per square inch. The resulting concrete materially cuts down gamma ray transmission through it.

A wall of barite-aggregate concrete four inches thick transmits only about 25% of the gamma rays striking it. A wall eight inches thick transmits less than 5%.

Experimental techniques used by the scientists while making the study are reported in the *Canadian Journal of Technology* (Dec., 1952). Durability of the concrete was not determined.

Science News Letter, January 17, 1953

E FIELDS

PSYCHOLOGY

"Action Psychology" Irons Out Plant Problems

➤ INDUSTRIALISTS CAN get rid of more of their production problems by using "action psychology" than they can by using the "static psychology" method.

Dr. R. M. Bellows of Roger Bellows and Associates, Detroit, told the American Association for the Advancement of Science meeting in St. Louis that industrial psychologists have been "barking up the wrong tree" by dealing with isolated individuals instead of with the groups of individuals involved in industrial problems.

He said that "action psychology" looks at a problem as a whole and tries to solve it partly through discussions in which all persons concerned take part. If such techniques had been used in the past, "it is likely there would be less industrial strife, fewer misunderstandings, than exist today."

Action psychology differs from static psychology because, as the investigation of a problem progresses, changes are made in the original situation which in turn influence the findings of the survey. The whole idea is aimed at improving the situation as the investigation goes along.

Static psychological studies merely investigate the existing problem. At the end, the findings are written up into a literary report which often is shelved without action.

Science News Letter, January 17, 1953

NUTRITION

5,000-Calorie Fluid Diet for Non-Eaters

➤ PATIENTS NEAR death because obstructions in their digestive tracts kept them from eating enough improved dramatically when given a high calorie liquid diet consisting primarily of a 40% peanut oil emulsion, three Chicago doctors report in the *Journal of the American Medical Association* (Dec. 27, 1952).

The three reporting are Drs. Edward M. Goldberg, Irving F. Stein, Jr., and Karl A. Meyer of Northwestern University Medical School, Cook County Hospital and the Hektoen Institute for Medical Research.

Many of the 90 patients got between 4,000 and 5,000 calories a day, and some got more than 5,000 calories. There were over 14 ounces of fat in the daily diet. Those with benign obstructing conditions gained weight markedly, and even those with cancerous obstructions showed benefit if the cancer was not far advanced.

Patients with obstructions of the mouth, esophagus or stomach who require operations can only take a liquid diet. Such patients often enter a charity hospital weeks or months after the start of symptoms, and as a result are so severely undernourished that operating on them is more than usually risky, the doctors point out. They therefore made this special study to see whether a high calorie liquid feeding could be given either as the only food or as a supplement to other food to give the patients the strength and weight they needed.

The results showed such liquid feedings could succeed, even though about half the patients suffered mild and transistory symptoms of vomiting, diarrhea or constipation.

Science News Letter, January 17, 1953

PUBLIC HEALTH

Heart Disease Deaths To Climb This Month

➤ DEATHS FROM diseases of the heart and blood vessels will be on the up-grade from now through March. Reasons for the increase, expected to be about 13% above the monthly averages, are:

1. More pneumonia, bronchitis and other illnesses at this season which put more strain on heart and circulation.

2. Winter activities calling for greater than usual physical exertion, from stoking the furnace to pushing stalled cars.

For the winter months, the American Heart Association in New York gives the following heart-guarding suggestions:

1. Avoid self-diagnosis; 2. avoid overexertion; 3. get plenty of rest; 4. avoid overweight; 5. avoid infections; 6. don't worry.

Science News Letter, January 17, 1953

METEOROLOGY

Stormy Weather Now Duplicated in Laboratory

➤ LARGE-SCALE EDDIES, huge cyclones and anti-cyclones which are the start of stormy weather, have been duplicated on a small scale in the Weather Bureau's laboratories in Washington.

One discovery from this model of the atmosphere was that large scale eddies grow from relatively small disturbances when the atmosphere is in a condition of dynamic instability. "Relatively small" disturbances in the open air are about 50 to 100 miles across. In the laboratory they were produced on a model which looked like a curved bowl turned upside down. Over this bowl was placed a plastic cover. The "atmosphere" existed in between. The top of the bowl was the North Pole.

Tobacco smoke outlined the eddies. The scientist who built the model, Lester F. Hubert, first tried cigarette smoke, then switched to a generator which "smoked" a brass pipe full of tobacco.

This is one of the first models of the atmosphere in which air is actually used. Other models have used liquids to represent the atmosphere.

An account of the experiments appears in *Transactions of American Geophysical Union* (Dec., 1952).

Science News Letter, January 17, 1953

INVENTION

Powerful Synchrotron Receives Patent

➤ A PATENT on the synchrotron, powerful atom-smasher, has been granted, almost six years after it was applied for. The patent is assigned to the Atomic Energy Commission by Dr. Edwin M. McMillan, professor of physics at the University of California. Patent number is 2,624,841.

The university has a 300,000,000 electron volt (300 Mev) synchrotron based on Dr. McMillan's patent. The synchrotron accelerates electrons almost to the speed of light. They are first accelerated to 2 Mev by operation of the machine as a betatron. Then the electrons are boosted to 300 Mev by applying an alternating current to the accelerating electrode. The magnetic field is rapidly increased to compensate for the increase in mass of the electrons at higher energies.

Science News Letter, January 17, 1953

MEDICINE

No Basic Cause For Alcoholism

➤ LOOKING FOR "basic causes" of alcoholism is "futile," declares Dr. Albert D. Ullman of Tufts College, Boston.

The underlying causes, he says, may be any factors which produce tension. Such factors may be experienced by anyone in the course of his life.

Treatment should be directed toward substituting other tension-reducing activities for drinking. The substitute activities should help the alcoholic deal with the realities of situations rather than anesthetize himself against them.

Dr. Ullman gives his views in the *Quarterly Journal of Alcohol Studies* (Dec., 1952).

Science News Letter, January 17, 1953

PUBLIC SAFETY

Full Auto License Only Upon Marriage

➤ A FULL-FLEDGED driving license would be issued only with a marriage certificate for men under 25 years of age, if Dr. A. R. Lauer, Iowa State College psychologist, had his way.

Married men have less driving trouble than single men and are a much better insurance risk, Dr. Lauer's study of a thousand drivers has shown. Young men drive more at night and have more accidents than men with more driving experience.

Driver training for boys should start early, since his studies reported to the American Association for the Advancement of Science meeting in St. Louis show that men benefit from training only if under 20 or over 40.

For women, formal driver training lowers accidents no matter what their age.

Science News Letter, January 17, 1953

NATURAL RESOURCES

Gasoline From Oil Shale

Oil shale is promising source of liquid fuels for years to come. Better means of recovering crude oil from this abundant mineral may soon make it competitive with natural petroleum.

By A. C. MONAHAN

➤ DRILLING A mile or two down into the crust of the earth to get petroleum is a costly undertaking, and the cost is certain, sooner or later, to be reflected in the retail price to consumers.

Drilling in inaccessible places, such as in northern Alaska or out in the ocean, is also costly. The protection against extreme retail prices is liquid fuels from oil shale or coal.

Improved methods of getting liquid fuels from these abundant natural materials are reducing the cost of production. Using them for synthetic liquid fuels is not new, but economical production is. In Scotland oil shale has been a source of liquid fuels for over 100 years. In Germany during World War II, gasoline and heating oil from shale and coal provided the Nazi war equipment with a large part of its power.

The methods used in both countries might be called crude, however, and better processes must be developed before synthetic fuels from these sources can compete in the market with products from natural petroleum.

Long steps have been taken in the United States, and probably elsewhere, since the war to develop better processes. Both the government and private industry are taking part here, and their efforts are bringing promising results. The cost of producing liquid fuels from oil shale and coal may soon be down to the rising cost of production from natural petroleum.

New Type of Retort

Very important in this progress is a new type of retort, called a gas-combustion retort, which gives promise of recovering high-grade liquid fuels from America's abundant oil shale at a cost in the competitive range. A development of the U. S. Bureau of Mines, the retort has been thoroughly tested in laboratory models and soon will be in operation in a large-size pilot plant now under construction.

It is a continuous-action retort, consisting of a vertical cylinder into the top of which broken oil shale is fed. After passing through a hot zone near the retort's center, where the shale's oil contents are removed, the "spent" shale is discharged automatically at the bottom, to be carried by conveyors to a dump pile.

Heat in the hot zone, provided by gas burners, vaporizes the oil products, which are carried off as gases generated in the form of mist. These are withdrawn near the top of the retort. Part of the gases discharged are combustible. With the oil removed, some of them are recycled back into the retort to burn and provide the necessary heat. The use of this fuel for heating is in large part responsible for the economy of the process.

Shale is a clay-like rock with an appearance much like slate. Oil shale is the same rock but one within which is a bituminous matter called kerogen. This material yields crude oil resembling petroleum when the oil shale is properly heated. Recovery of oil from oil shale is basically a simple operation. Heating it drives off oil in vapor form, and this is easily condensed to a liquid. When refined, the liquid yields about the same products as are obtained from petroleum.

There are complications, however, in producing oil suitable for refining from oil shale by a commercially economical process. These are being solved one by one by the U. S. Bureau of Mines, particularly at its pilot plant at Rifle, Colo.

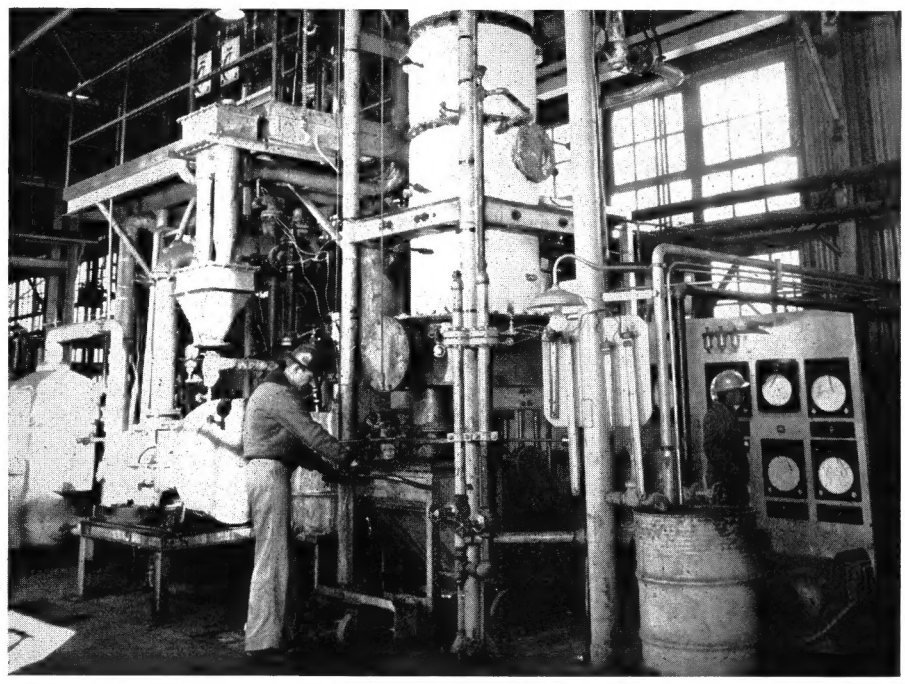
Liquid fuels are now being produced there at a low enough cost so that products are obtained at prices nearly competitive with petroleum products. With the new plant at Rifle, which should be ready to operate later this year, it is expected that production costs will be decreased and the products put fully into the competitive range.

Scotland is the country which has had the longest experience in producing fuel oils from oil shale. The centennial of the industry was celebrated about two years ago. Methods employed might be called crude, although better processes are now in use. They are not satisfactory for the United States, however, where natural petroleum is still plentiful. Scotland supplies a nation which relies almost wholly on imports. A strong enemy in time of war could cut the supply line completely.

Estonia Is Large Producer

Estonia is probably the world's largest producer of oils from shale. Its products now go into the Soviet Union, but during World War II they were largely responsible for power to operate German war equipment. Whatever progress has been made in improving methods of oil recovery in this country is unknown outside the Iron Curtain.

Russia itself has large deposits of oil shale, and in prewar years produced more



GAS-COMBUSTION RETORT—Developed by U. S. Bureau of Mines, this retort is a new and efficient device to recover oil from oil-shale. A large-size type will be the heart of a demonstration plant at Rifle, Colo., now under construction.

oil from it than any other nation except Estonia. France has produced oil from shale for some 70 years.

Oil shale, suitable for oil production, is found in many countries. It is already being used to a small degree in Brazil, and may in the future become important in fuel production in Australia, which now imports its liquid fuels for automobiles, diesels and other power.

Within the United States there is considerable disagreement on the question whether experimental work in making synthetic liquid fuels from coal, shale or natural gas are justified at this time. Congress, however, has provided funds for experimental work.

Utilization of Wastes

The U. S. Bureau of Mines is working on production from coal, shale and natural gas, while the Department of Agriculture is concerned with alcohol from farm wastes as a substitute for gasoline.

America has plenty of natural petroleum to meet all present needs and those of the next few decades. Some say there is enough for 75 years. But, sooner or later, with decreasing production and increasing use of liquid fuels, petroleum alone will not meet the demand. Then synthetic liquid fuels will become essential.

How long the known petroleum reserves will last can be easily estimated. What new deposits will be discovered is uncertain. The oil industry seems to be firm in the belief that there are many not yet discovered, but they are deep down in the earth or are in inaccessible places. This means that cost of production will be greater and that synthetic fuels may be needed to supplement the petroleum products.

Science News Letter, January 17, 1953

METEOROLOGY

Strato Cold Fronts Jar High-Flying Jets

➤ THE ANSWER to plane-jarring turbulence high in the air may be found in studies which show that cold fronts sometimes extend up into the stratosphere.

These studies also show that the high reaching cold fronts may be a cause of the extremely fast jet streams, narrow bands of high wind which travel from west to east between 15,000 and 40,000 feet.

Pilots who have reported the turbulence, suddenly hitting the plane in a clear blue sky, tend to find it near a cold front such as this and a jet stream beside it. A study, carried on in Washington by Conrad P. Mook of the U. S. Weather Bureau, has covered 241 of these cases. Based on the theory that the jet stream and a cold front may jointly be responsible for many cases of meeting turbulence, further questionnaires to pilots will ask whether the pilot met a big temperature change during the bumping around.

If the answers are "yes," this will tend to confirm research, carried on by Roy Bergren, showing that the cold fronts do extend high into the stratosphere and indicating that the jet streams might be caused by the extreme temperature contrasts found along the fronts. Theoretical research by Jerome Namias and Philip Clapp of the U. S. Weather Bureau advanced this hypothesis about two years ago.

Such turbulence has sometimes been strong enough to break up planes. Plane design must take it into account.

Science News Letter, January 17, 1953

Where Do You Want To Go?

France? Brazil? West Indies? Hawaii? Mexico?

Read what the Christian Science Monitor says about a new way to travel that sometimes costs 1/3 to 1/2 less.

BY THE *travel editor of The Christian Science Monitor:* Many fascinating travel booklets pass over this desk in the course of a year but the one that arrived the other day so interested this department that it cost the office several hours of work in order that we might absorb its content. The booklet is entitled "Travel Routes Around the World" and is the traveler's directory to passenger-carrying freighters and liners. In no time at all you find yourself far out to sea cruising along under tropical skies without a care in the world. You find yourself docking at strange ports and taking land tours to those places you long have read about. Most interesting of the vast listings of ships are the freighters which carry a limited number of passengers in quarters comparable to the luxury offered in the so-called big cruise ships which devote most of their space for passengers.

The booklet first of all answers the question: What is a freighter? The modern freighter, says the booklet, ranks with the de luxe passenger vessels so far as comfort and accommodations are concerned.

LARGE ROOMS WITH BEDS

It is important to realize that in most cases today, freighter passengers are considered first-class passengers, although the rates charged are generally on a par with either cabin or tourist class fare. Most passenger-carrying freighters, to quote the booklet, have their private bath and shower, and these cabins offer beds, not bunks. The rooms are generally larger than equivalent accommodations aboard passenger ships, and the cabin of a modern freighter is sometimes even twice as large as first-class cabins on some of the older passenger ships. It goes without saying that your room is on the outside, and amidships, the most expensive of all locations, for which you are usually charged a premium over the advertised minimum fares on passenger ships.

This booklet points out that it is frequently astonishing how low freighter fares are as compared with passenger ship fares: for example, less than one-half of the passenger ship fare to California is the amount asked on freighters. On most of the longer runs, the difference in favor of the freighters is regularly from a third to half of the passenger ship fare.

SERVICE AND MEALS RATED EXCELLENT

Service and meals on a freighter leave little to be desired. You will be treated with consideration. Stewards will go out of their way to make your voyage pleasant. On ships with East Indian stewards you will be waited on almost hand and foot, in a manner that is completely unknown to Americans and most Europeans.

Foreign ships offer their own specialties, says the booklet. Thus vessels in the East Indian trade serve Rijkstafel (or King's Table), the East Indian dish which can run to as many as 50 different courses. Scandinavian ships serve Smorgasbord every day, and some of their desserts (like strawberries smothered in a huge bowl of whipped cream) are never forgotten. Another feature of freighter travel is in its informality. No formal clothes are needed. Sport clothes are enough.

Other valuable information such as how to tip, shipboard activities and costs are covered in the booklet, "Travel Routes Around the World."

Some of the trips listed include a trip to England for $160, a 12-day Caribbean cruise for $240, or a leisurely three-month Mediterranean voyage.

The booklet is published by Harian Publications, Greenlawn, New York, and may be obtained by sending to the publisher.

So, when it arrives all you need to do is sit down and take your choice. The booklet lists literally hundreds of ocean trips.

$1 sends you this up-to-date guide plus LANDS IN THE SUN, a guide to where to stay a while—even retire—in the West Indies, Mexico, Guatemala, and other lands to the south where the dollar buys so much more.

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N. W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

ALCOHOLISM: A Sickness That Can Be Beaten —Alton L. Blakeslee—*Public Affairs Committee,* 32 p., illus., paper, 25 cents. A pamphlet that points out some of the ways this sickness, which affects about 4,000,000 Americans, is moving from the realm of morality into science and medicine. According to the author only 20% of the alcoholics are of the "skid row" type.

THE CASE METHOD OF TEACHING HUMAN RELATIONS AND ADMINISTRATION—Kenneth R. Andrews, Ed.—*Harvard University Press,* 271 p., $4.50. A collection of papers by those who teach and do research in human relations at the Harvard Business School.

CHEMICAL INDUCTION OF CANCER—George Wolf—*Harvard University Press,* 250 p., illus., $3.50. Primarily concerned with the experimental induction of tumors in animals by chemical compounds.

CONSERVATION: Thirteenth Annual Biology Colloquium—Stanley A. Cain, Leader—*Oregon State Chapter of Phi Kappa Phi,* 40 p., paper, 75 cents. Restricted to the two resources, agriculture and forestry, the committee's purpose was to present a balanced picture of conservation in these areas.

DEVELOPMENT OF INTERNATIONAL COOPERATION IN SCIENCE: A Symposium—William W. Rubey and others—*National Academy of Sciences-National Research Council,* 27 p., paper, free upon request to publisher, 2101 Constitution Ave., Washington 25, D. C. The symposium was arranged to bring before the general scientific public some of the problems and history of international cooperation in science.

EGO PSYCHOLOGY AND THE PSYCHOSES—Paul Federn—*Basic Books,* 375 p., $6.00. Psychiatrists, psychologists and other professional workers in this field will welcome the publication of these original contributions of Freud's student.

EUGENICS: Galton and After—C. P. Blacker—*Harvard University Press,* 349 p., $5.00. The first section is devoted to the scientific activities, the personality, and the views on eugenics of Francis Galton; the second half discusses the developments which have occurred in eugenics since the death of the founder.

THE INDUSTRIAL APPLICATION OF AERODYNAMIC TECHNIQUES—*Her Majesty's Stationery Office,* Notes on Applied Science No. 2, 37 p., illus., paper, 90 cents. The second in a series, this handbook deals with a number of special applications of aerodynamic equipment and techniques, and attempts to illustrate how the knowledge gained in aerodynamic research can be applied to a wide range of industrial problems.

THE LITERATURE ON STREPTOMYCIN: 1944-1952—Selman A. Waksman—*Rutgers University Press,* 2nd ed., 553 p., $5.00. Since the publication of the first edition less than four years ago, references dealing with this antibiotic have increased from 1,200 to almost 6,000. The new edition is largely devoted to the clinical uses of streptomycin.

MANPOWER RESOURCES IN PHYSICS, 1951—Theresa R. Shapiro—*Govt. Printing Office,* Scientific Manpower Series No. 3, 46 p., paper, 20 cents. An analytical report on one of the most serious problems in the field of scientific manpower, the shortage of physicists in this country.

MOGOLLON CULTURAL CONTINUITY AND CHANGE: The Stratigraphic Analysis of Tularosa and Cordova Caves—Paul S. Martin and others —*Chicago Natural History Museum,* Fieldiana: Anthropology, Vol. 40, 528 p., illus., paper, $8.00. Reports on archaeological investigations in west central New Mexico that began in 1939.

PLEISTOCENE GEOLOGY OF KANSAS—John C. Frye and A. Byron Leonard—*University of Kansas Publications,* Bulletin 99, 230 p., illus., paper, 25 cents. Data on the general geology of Kansas Pleistocene deposits which underlie much of the surface of Kansas, and contain more than 60% of the State's ground water supply.

PROCEEDINGS OF THE SECOND MIDWESTERN CONFERENCE ON FLUID MECHANICS 1952—*College of Engineering, Ohio State University;* 529 p., paper, $6.00. Contains the papers given at the conference held at The Ohio State University March 17-19, 1952.

SCHOOLS AT WORK IN 48 STATES: A Study of Elementary School Practices—Effie Bathurst and Glenn Blough, Eds.—*Govt. Printing Office,* 138 p., illus., paper, 35 cents. Describes how some schools are effectively handling certain common educational problems.

SIR JAMES JEANS: A Biography—E. A. Milne—*Cambridge University Press,* 175 p., illus., $4.00. An interesting book about the life and contributions of this genius in mathematical physics, who spent the second part of his life popularizing the theories of astronomers and physicists.

A SURVEY OF HOUSING RESEARCH IN THE UNITED STATES—William H. Scheick, Executive Director—*Govt. Printing Office,* 723 p., paper, $3.00. Provides industry with information on housing research being undertaken by educational institutions, scientific foundations, professional societies, trade associations and commercial laboratories.

THE TREATMENT OF THE YOUNG DELINQUENT —J. Arthur Hoyles—*Philosophical Library,* 273 p., $4.75. An English minister surveys the changes in reaction to juvenile delinquency and examines the developments in treatment in relation to Christian principles.

THE WHITE PLAGUE: Tuberculosis, Man and Society—Rene and Jean Dubos—*Little, Brown,* 277 p., $4.00. A vivid account of tuberculosis, its causes, cures, and effects on society, since the nineteenth century. The authors think that the disease is the consequence of defects in social organization.

Science News Letter, January 17, 1953

PSYCHOLOGY

Psycho-Drama Used As Educational Technique

➤ HOW YOU act can alter how you feel. That is the theory behind a new educational technique being developed at the University of Wisconsin.

The idea of combining psycho-drama with the regular methods of instruction in the dance department belongs to Dr. Thelma Hruza of the University's Medical School.

"The central idea, that a change of action pattern can guide a change of feeling or emotion, is simple," she explains. "It is not to be confused, however, with makeshift attempts to bolster a person's morale through sentimental escapism. The process is delicate, painstaking and aimed at the roots of personality structure," she adds.

"I regard it as one of the most effective classroom techniques yet devised in the whole area of education for better emotional and personal-social adjustment, an area sadly neglected in much of our educational system," Dr. Hruza concludes.

Science News Letter, January 17, 1953

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By
B. W. ANDERSON
Director of the Precious Stone Laboratory, London Chamber of Commerce

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BIOLOGY

Rat-Cat Friendship

Psychologist finds that cooperation among traditional animal enemies is possible after training. Experiments point to possible path toward world peace.

See Front Cover

➤ TOM AND Jerry, the cat and rodent team of movie cartoons, often take swipes at each other, but usually end up the best of friends.

Now a psychologist has found that cat-rodent cooperation is not restricted to the cartoons. Dr. L. S. Tsai of Tulane University, New Orleans, told the American Association for the Advancement of Science meeting in St. Louis that he had trained a confirmed rat-killing alley cat to work peacefully with a juicy rat for the mutual benefit of both.

For his experiment, Dr. Tsai selected a "very ferocious cat given to us by a family in which she had enjoyed a long and glorious record of rat-killing." While in the laboratory, the cat caught and killed five rats, proving the justice of his reputation.

The cat, called Tom, and the rat, Jerry, were placed in a single cage, but separated by a glass, and later a wire, partition. This cage had an electrically controlled door connecting it with a common cage equipped with two electric buttons that opened still another door.

Beyond this second door was food. But to get to it Tom had to press one of the buttons and Jerry the other. Unless they worked together, neither would eat—except maybe Tom, if Jerry was not fast enough.

It took about 700 trials lasting over three and a half months before the cat finally cooperated with the rat without any act of aggression. (One of Jerry's kin was killed early in the experiment.)

From then on, the rat-killer, Tom, ate amicably out of the same dish with Jerry, the juicy rat.

Dr. Tsai then threw in an extra complication. An electric button controlling Jerry's cage door was placed in Tom's cage. The only way the rat would be available to help the cat reach food was for Tom to press the button, releasing his old enemy, but now his partner. Tom learned to do this in a hurry.

Thus, through conditioning, the habitual rat-killing cat has been taught to cooperate with his traditional "enemy" towards a common goal, Dr. Tsai said, demonstrating the immense possibility and power of education.

This discovery may throw overboard the idea that in animal nature there is an indestructible instinct of pugnacity which makes fighting or wars inevitable, Dr. Tsai said.

Since the experiment failed to show any such pugnacity instinct even among supposed natural enemies, the rat and cat, Dr. Tsai said, this research may point to a biological foundation for the possibility of world peace.

Other experiments by Dr. Tsai on cooperation among traditional animal enemies resulted in the three-way friendship pictured on the cover of this week's SCIENCE NEWS LETTER, with the rat, cat and dog eating amicably from the same dish.

Science News Letter, January 17, 1953

TECHNOLOGY

Motors Canned to Protect Atomic Sub

➤ TO PROTECT future crewmen of the Navy's first atom-powered submarine Nautilus from dangerous radioactive leaks in the nuclear reactor's hot-water system, Westinghouse design engineers have "bottled up" the motors that will pump the radioactive water from the reactor to the sub's boilers and then back again.

Seals ordinarily used to separate the pumping motor from the liquid being pumped were not satisfactory. All leaked to a certain extent. Since the water would be radioactive after passing through the hot atomic reactor, any such leak aboard the Nautilus could expose crewmen to dangerous radiation.

"Canned" right into the hot-water circulating system, the motor's rotating element and its stationary part both are jacketed in stainless steel coverings. The complete motor is immersed in the very water that is being pumped. Electric current is fed to coils in the stationary part of the motor, and the resulting electromagnetic fields cause the rotor to turn, pumping some of the "hot" liquid right through the motor itself.

Science News Letter, January 17, 1953

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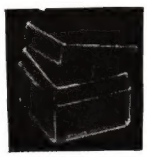

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2. INTERNAL BALLISTICS by Colonel F. R. W. Hunt. An exhaustive treatise on research in that branch of applied physics relating to the properties of propellants and the motion of the projectile in the gun. **$12.00**

3. HARWELL—THE BRITISH ATOMIC ENERGY RESEARCH ESTABLISHMENT 1946-1951. Prepared by the Ministry of Supply and the Central Office of Information. After giving a brief account of the events leading to the formation of the British Atomic Energy Research Establishment in 1946, and a review of its organization, there is an outline of the main tasks on which Harwell is working. These are treated under four heads: (1) the production program; (2) isotopes; (3) nuclear reactors, and (4) particle accelerators. **$3.75**

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5. OUT OF MY LATER YEARS by Albert Einstein. The distinguished physicist, always an independent and uncompromising thinker, deals with the most urgent questions of modern society: Social, religious, educational, and racial relationships. Various sections deal with personal credos, politics, education, the Jewish issue, war and peace, the fundamental principles of physics. In several chapters the author explains his theory of relativity in such simple terms as to be understood by every intelligent person. The book shows Einstein the philosopher, Einstein the scientist, and Einstein the man. It is a treasury of living thought and a striking record of one of our most eminent contemporaries. **$4.75**

6. DEAD CITIES AND FORGOTTEN TRIBES by Gordon Cooper. In this book Gordon Cooper traces the history of vanished peoples, their rulers and their fate: he tells too, of some of the least known races of the world, like the Lepches of Sikkim and the Jivaros of Peru, and the strange people of the Lost Valley in the Loranje Mountains in New Guinea, who were discovered by the crew of an American plane making an emergency landing during the war. **$4.75**

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BIOLOGY

Snakes Moves by Pushing With Its Belly Plates

➤ X-RAY MOTION pictures taken with a cinefluorographic camera at the University of Rochester reveal what Solomon did not know: how a snake moves.

Dr. James A. Oliver, curator of reptiles of the New York Zoological Society, brought a four-foot, poisonous African puff adder to the University of Rochester's medical school, Rochester, N. Y., where X-ray movies were made of the movements of the reptile as it traveled in a straight line.

Contrary to a popular idea, the X-ray movies showed that the snake did not move by "walking on its ribs." Instead, the snake was seen to crawl along by alternate pushes of the separate plates, or scutes, of skin that line his underside, powered by his strong stomach muscles.

When a snake is in a hurry it uses a different "gait," commonly called "lateral undulatory movement." As it wriggles along its body pushes against bumps on the rough surface of the ground.

Another gait commonly used by desert snakes is side-winding. When a side-winder rattlesnake travels in this fashion it shapes its body into loops and it seems to be moving sidewise.

Science News Letter, January 17, 1953

X-RAY SNAKE'S MOVEMENTS—Dr. James A. Oliver, curator of reptiles of the New York Zoological Society, took X-ray movies of an adder to show that snakes get where they are going by moving their belly skin plates.

River *water* usually is "harder" in winter than in summer.

TV sets too near each other actually can interfere with each other's reception.

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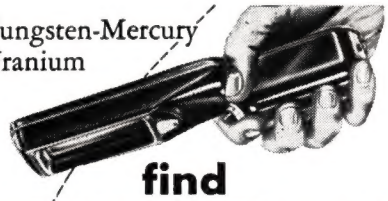

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BIOCHEMISTRY

Radiation Exposure Told

➤ A PRACTICAL, sensitive test for exposure to very small amounts of dangerous rays from atom-smashing cyclotrons can be made by examining the white blood cells called lymphocytes.

Ordinarily these cells have only a single nucleus each. But the radiation from the cyclotron causes a change so that lymphocytes with two-lobed nuclei appear in the blood. Scientists at the University of Rochester's School of Medicine and Atomic Energy Project, Rochester, N. Y., discovered this early in their cyclotron operations.

The finding was confirmed in two "incidents" since then. In one, four physicists were in the cyclotron building when the man at the control panel made certain adjustments that made possible some slight exposure of the physicists to the beam. In the other, two machinists by mistake got within 50 feet of the cyclotron building while the atom smasher was running. This was before an earth and concrete dike around it had been finished.

Lymphocytes with bilobed nuclei appeared in greater numbers than normal in the blood of all six of these persons for a few weeks after exposure to the radiation from the cyclotron.

Increased numbers of white blood cells of this kind may also appear in germ diseases and in leukemia, but the four physicists and two machinists were not suffering from such diseases at the time their blood showed lymphocytes with bilobed nuclei.

Because these cells appear as a result of exposure to "exceptionally small amounts of radiation," the University of Rochester scientists believe this kind of blood test is a valuable addition to physical monitoring, such as radiation exposure badges.

Reporting the studies in *Science* (Dec. 26, 1952) are M. Ingram, M. Adams, L. Coonan, J. Jespersen, G. Nielsen, D. Piatt and G. Yettewich.

Science News Letter, January 17, 1953

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PHYSICS

Water Is Crystalline

➤ SIX KINDS of water helped Dr. Jui H. Wang, research fellow at Yale University, learn that water at ordinary temperatures has crystalline structure.

Dr. Wang reported his studies to the American Association for the Advancement of Science meeting in St. Louis.

Heavy forms of both hydrogen and oxygen, the chemical elements of which water is made, were used to make up the six kinds of water. Ordinary hydrogen, deuterium and tritium are the three kinds of hydrogen, and he combined them with two kinds, or isotopes, of oxygen, known as O-16 and O-18.

The commonly found kind of water is made up of one atom of O-16 and two atoms of H-1, making a total of 18 units of molecular weight. The heaviest of the isotopic kind of water is made up of one atom of O-18 plus two atoms of tritium, H-3, which adds up to 24.

The greater weight of these particles of heavier water makes a difference in quantities that can be measured, Dr. Wang finds. He has applied this information to studying the way one kind of water diffuses through another when they are mixed, with and without stirring.

Crystalline structure even in liquid water explains in part how water can be denser a little above its freezing point, and expand when it freezes. Atoms are packed most tightly together when the water is at its greatest density, Dr. Wang found, but are spaced out in crystalline arrangement both when frozen and when heated above the maximum density point.

Water made with heavy isotopes reaches its greatest density at a higher temperature than does ordinary water.

Science News Letter, January 17, 1953

BIOCHEMISTRY

Cannot Tell Human From Monkey Blood Stain

➤ NO SIMPLE, practical laboratory test can tell whether a stain was made by human blood or by blood from apes, monkeys or lemurs, Dr. R. B. H. Gradwohl, director of the St. Louis Police Laboratory, declared at the meeting of the American Association for the Advancement of Science in that city.

In fact, he said, in the precipitin reaction, standard test for identifying blood, chimpanzee blood gives an identical reaction to human blood when tested with anti-human precipitin, and human blood reacts just like chimpanzee blood when tested with anti-chimpanzee precipitin.

Dr. Gradwohl's findings agree with those made by Dr. J. E. Duncan-Taylor of Capetown, South Africa, he said.

He warned scientists appearing in court and testifying in homicide cases about how specific the anti-human precipitin test is, to be on their guard lest conclusions be drawn which cannot be supported scientifically.

It is time, he declared, to check and recheck the whole problem.

Science News Letter, January 17, 1953

Questions

AERONAUTICS—What is a "stopway?" p. 36.

• • •

ANTHROPOLOGY—Why is a recently discovered bone believed to be that of the first true man? p. 37.

• • •

CYTOLOGY—How can heart cells be kept alive for at least a month? p. 40.

• • •

EDUCATION—What would be the advantage of admitting boys to school six months later than girls? p. 37.

• • •

GENERAL SCIENCE—What Russian sciences are now considered adequate? p. 39.

• • •

PSYCHOLOGY—What is "action psychology?" p. 41.

• • •

PUBLIC HEALTH—For what reasons will heart disease incidence climb this month? p. 41.

• • •

Photographs: Cover, Loh Seng Tsai; p. 35, Fremont Davis; p. 37, Stanford University; p. 38, U. S. National Museum; p. 42, U. S. Bureau of Mines; p. 46, University of Rochester; p. 48, Motorola.

Do You Know?

Watch *"jewels"* cost about $3 a dozen.

Under certain conditions, *sound waves* can put out fires.

Steady dripping of a single faucet will waste 24 gallons of *water* daily.

Food production in 1953 is expected to be slightly higher than in 1952.

The average home *freezer,* full or nearly full of food, will remain below freezing temperatures for about 48 hours after the power is cut off.

Using a *transistor* in his transmitter, a radio "ham" recently communicated with another amateur 25 miles away; this is believed to be the first use of a transistor in VHF radio transmission.

If properly trained in *color perception,* some persons can distinguish with unaided eyes as many as 500,000 colors of various hues, densities, purities and brightnesses, one scientist states.

An experimental *television system* produces the video picture by causing the picture tube's electron beam to sweep across the screen at varying speeds—slowly for highlights, rapidly for shadows.

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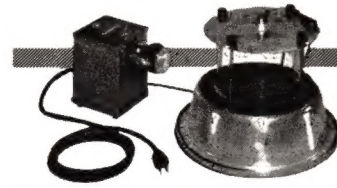

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CLEANSING COMPOUND removes rust and scale from steel. Acidic in nature, the compound is available in powder form in 100- and 400-pound quantities, and mixes with hot water into controlled acid concentrations that also attack oil films. The cleanser is said to be easier and safer to handle than strong acids.

Science News Letter, January 17, 1953

BALL VALVE for tank-type toilets can be installed in three minutes and assures positive closing of the discharge valve after flushing, eliminating jiggling the controls, the manufacturer states. It has a special self-centering guide that helps the ball to seat properly over the discharge pipe.

Science News Letter, January 17, 1953

PLASTIC CEMENTS, formerly available in bulk, now can be obtained by the homeowner in small quantities. The cements actually form a series, each cement working best on certain specific types of plastics. One cement will join plastics to glass, wood and metal without heat, pressure or special surface preparations.

Science News Letter, January 17, 1953

HAND-HELD TRANSMITTER, as shown in the photograph, is designed to operate in the 152-174 megacycle frequency

band and is powered by self-contained dry batteries. Weighing only one pound, 13 ounces, the unit is effective over a five-mile range and is useful to firemen, policemen, news reporters and watchmen.

Science News Letter, January 17, 1953

NEW WALL PRIMER dries in 45 minutes to two hours and seals porous surfaces, including patch-up spots and hairline cracks in plaster. Especially suited for top-coating with popular flat wall-finishes, the primer has a polyvinyl acetate base that produces no solvent odor.

Science News Letter, January 17, 1953

DIESEL FUEL improver blends in tiny amounts with ordinary diesel fuel at refineries or at storage terminals to make the fuel ignite more quickly. The improver recently underwent successful year-long Navy tests and now is available commercially.

Science News Letter, January 17, 1953

TOY AUTOMOBILE operates by remote control from a hand-held battery case having two push-buttons that direct the car to speed ahead, or to turn left or right. Made of a cellulose acetate plastic, the small car safely withstands the bumps and collisions of playtime traffic.

Science News Letter, January 17, 1953

"ICE-CUBELET" MACHINE turns out 20,000 cubelets a day for hospitals, restaurants and soda fountains. The small "cubes," said to cool faster and last longer than crushed, chipped or flaked ice, are five-eighths of an inch on a side. Thickness can be adjusted as required.

Science News Letter, January 17, 1953

• Nature Ramblings •

Aquatic Aristocrats

➤ USED AS we are to thinking of swans as the pampered darlings of English country estates, sailing their dignified ways over mirror-like little lakes, we may be a little astonished to learn that America has wild swans. Like their more plebeian relatives the geese, they nest in Canada for choice, but appear on broad waters in the wilder parts of the United States quite frequently.

Our swans are not precisely the same as the European "mute" swans, but they look very much like them; certainly as dignified and graceful. The commonest American swan is the so-called whistler, or whistling swan. It gets its name presumably from the "who-who-who" call of the flock leader, sounded like a note on one of the lower wood-wind instruments as the migrating birds go over in the night. Besides this call, the whistling swan has a considerable variety of other notes.

The other American swan species, the trumpeter swan, is now a great rarity, and few of us indeed ever get to see it. It is a huge bird, white, tinged with rusty color on its head, reaching an over-all length of five feet. Because of its great beauty and size it was hunted remorselessly during the days of the reckless exploitation of our wild life, so that it was thought for a while to be extinct, like the passenger pigeon.

Now, however, at the Red Rock Lakes Migratory Waterfowl Refuge in southwestern Montana, one can see some evidence that the graceful birds have been saved. The flock of 76 found in the valley of Red Rock Lakes nearly half a century ago has increased to 535.

The birds make this area their year-round habitat, for the secluded valley has natural food, warm springs providing open pot holes for winter occupancy, and protected nesting areas.

On small islets, they pile a mound of bullrushes or organic debris until it is about eight feet across, with one-third projecting above the water. In the down-lined depression on top, they lay seven or eight eggs. Despite extreme care, however, many of the young die. The total population is, nevertheless, happily increasing.

Supplementing the trumpeters found in the United States, there are about 900 in the coastal areas of British Columbia, where the Canadian Wild Life Service carries on a program similar to that at Red Rock Lakes. Another estimated 200 have been noted in the Ketchikan area in southeastern Alaska.

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